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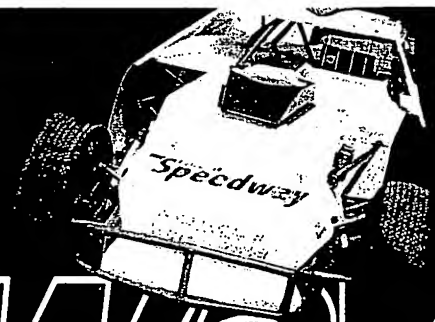

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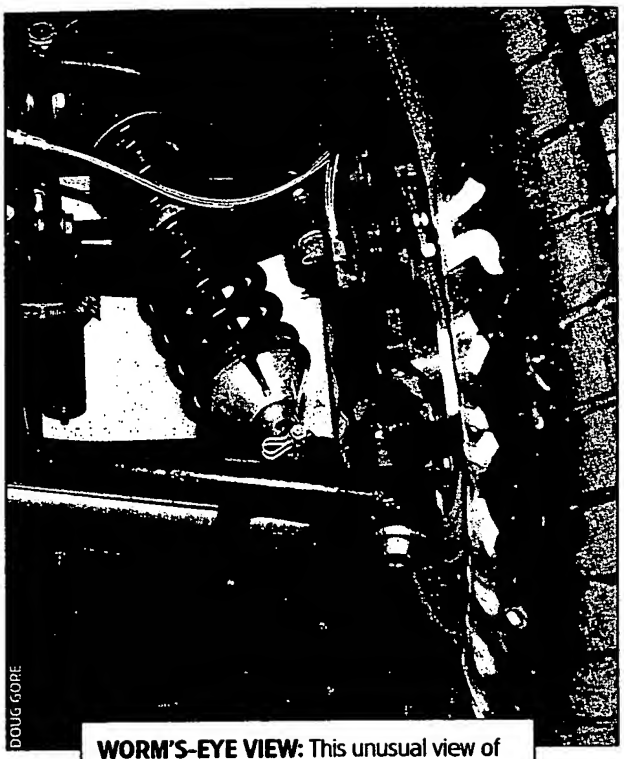
Low Friction Ball Joints

The quest for stronger, wear-resistant, low friction ball joints has produced a variety of choices.

By **Doug Gore**



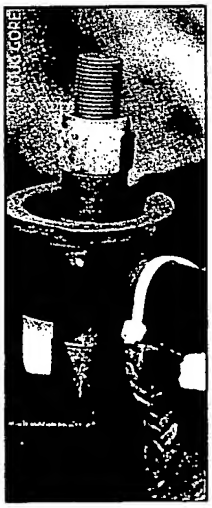
DOUG GORE

WORM'S-EYE VIEW: This unusual view of the bottom of a dirt late model reveals the long ball joint studs that are often used to adjust roll center heights.

TRW developed the first suspension ball joints for Ford in 1952. The design used a steel stud with a hardened ball on one end. A powerful spring and two concave sintered-iron bearing races held the ball within a housing. Within limits, the ball could move freely between the two races, both angularly and in rotation.

The design was good and even today Federal Mogul makes ball joints similar to the original, except for one major improvement. The iron bearing inserts have been replaced with plastic, chosen for its strength, wear resistance, and low friction. The goal was to reduce the need for frequent greasing of metal-to-metal bearing surfaces and extend the life of the ball joints. The new design is used on today's passenger cars.

During the turn of the century Howe Racing Products achieved a discovery that changed the design of racing ball joints forever.



DOUG GORE

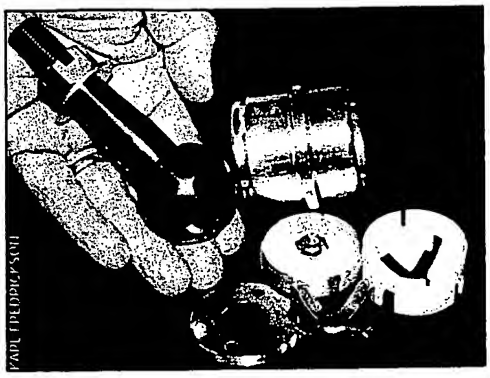
ONE BALL NOT FOR ALL: Using mono-balls for ball joints can result in very low friction as well as quick and easy repositioning with simple spacers. However, the angular travel is quite small and may not be enough for many applications.

Chas Howe recalls, "When working with the new radial tires, our data acquisition systems told us we were getting an abrupt camber change in the middle of the corners. When we test loaded the car in the shop, we discovered that the upper ball joints were unseating. At that time, the joints had springs that maintained pressure on the races and the tires produced such great cornering loads that the balls overpowered the springs.

"That caused us to look at mono-balls. But we were always running out of travel since the mono-balls have about 20 degrees less angular movement. We found we needed to constantly make different angle a-arms to get the travel we wanted. However, we found mono-balls had significantly less friction than ball joints. That helped free up the suspension and reduced lap times.

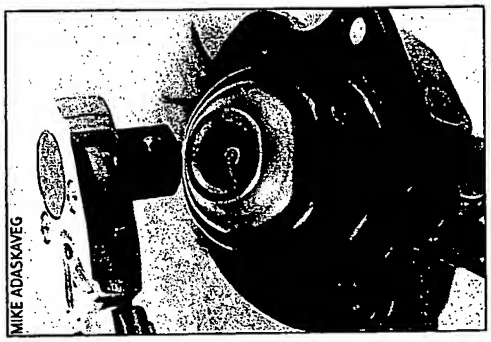
"So we decided to make a ball joint that was like a mono-ball but had the travel of a ball joint. The low friction turned out to be a bonus. Today, it is the low friction that sells the joints."

Howe's new, low friction ball joints, along with a competing Federal Mogul



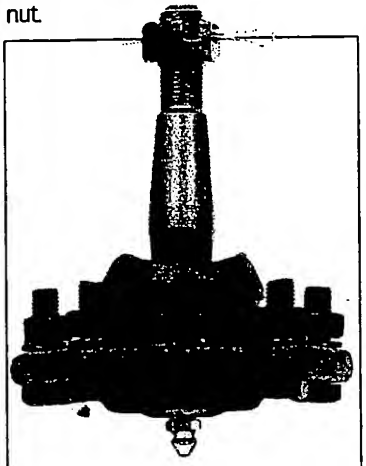
PAUL TREPPER/PSM

COMPONENTS: This disassembled QA1 low friction ball joint reveals the hardened steel ball, the nylon bearing race, and the tension-adjusting nut.



MIKE ADASKAVEG

ADJUSTABILITY: The preload on Howe's ball joints is user-adjustable from zero on up. The adjusting nut does not need to be more than finger tight. A set screw on the side of the housing locks the adjustment.



SLICK OPERATOR: Afco's low friction ball joints are factory set to have a two-pound breakaway. As is the case with the other manufacturers listed here, Afco's ball joints are available with different mounting configurations and different stud lengths.

design marketed exclusively by CV Products, quietly became the norm in stock car racing's top levels.

Today, several other suspension component manufacturers offer low friction ball joints or are about to.

Afco won a SEMA Product Award in 2006 for their new low friction design. Afco spokesman Rodney Brenner said their extremely low friction joints "require two pounds of force to move the studs. Other [OEM] designs require as much as 50 pounds of force to break them free. That amounts to a 50-pound suspension bind." Afco offers low friction upper and lower joints with screw-in, press-in, or four-bolt mounting designs. The joints are available in a variety of stud lengths for roll center adjustments.

QA1's Roger Wilson described their new low friction ball joints, which were introduced at PRI, "perfect for oval track racers since they reduce the breakaway torque to near zero so the driver can feel everything."

These joints use machined steel housings, into which hardened steel bearing races, a hardened ball stud, and a self-lubricating nylon cup are inserted. A torque nut holds everything together. The torque nut is used to adjust preload up from zero.

There is a grease fitting in the housing and grooves on the surface of the ball. Wilson said these joints can be run dry but I do not recommend it since there are metal-to-metal rubbing surfaces.

Different length studs are available and all of the other components are replaceable.

SOURCES

Afco Racing Products: *800-632-2320*
Howe Racing Enterprises, Inc.: *989-435-7080*
QA1: *800-721-7761*